



International Center for Urban Safety Engineering (ICUS)

Annual Report -2004- and Future
Directions

Safety Problems of Structures to be considered

Important items for safety problems of structures to be considered in Japan are as follows:

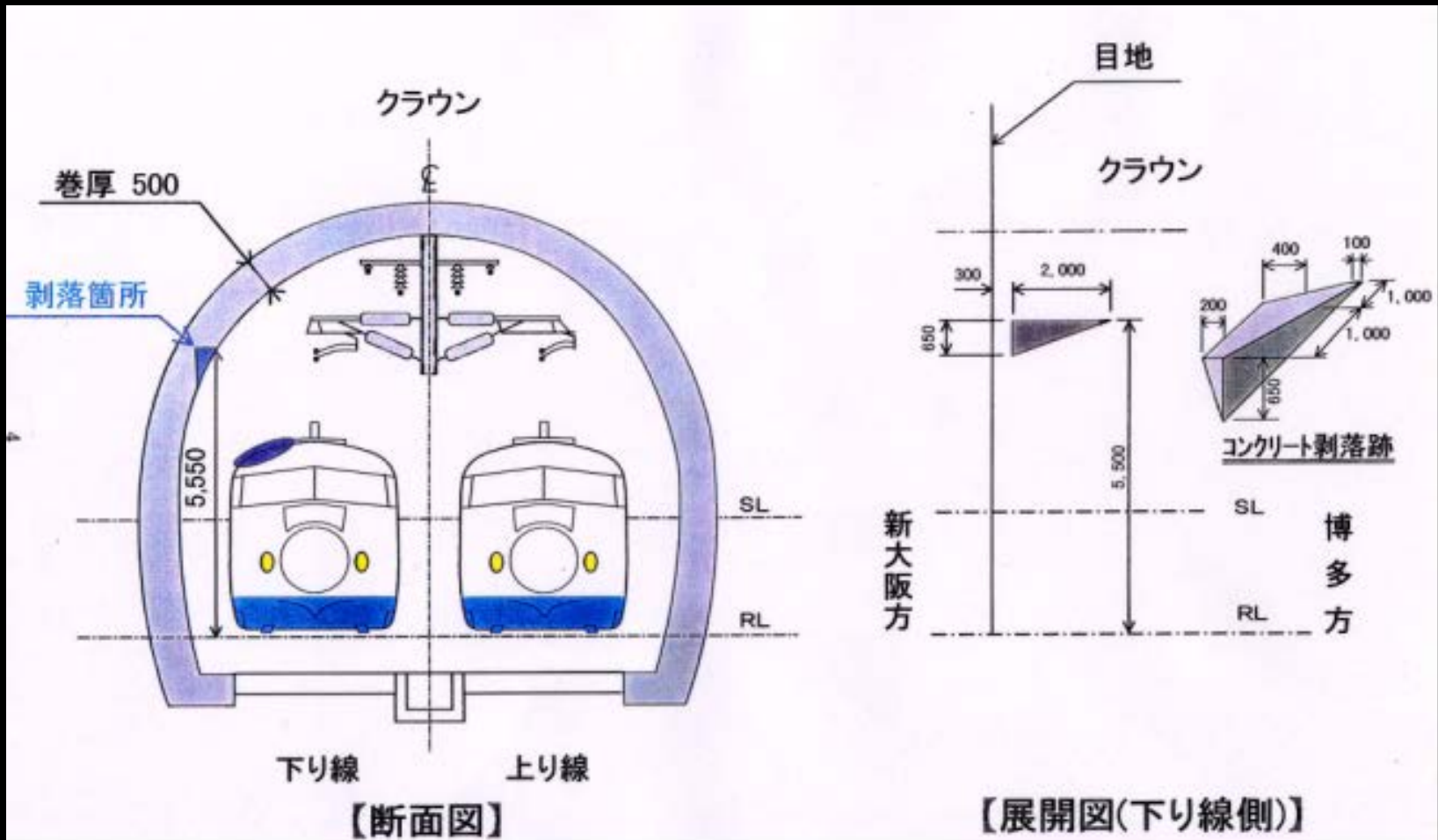
- 1. Earthquake, tsunami and volcanic action**
- 2. Wind and waves caused by typhoon**
- 3. Flood caused by typhoon**
- 4. Fire caused by earthquake and by accidents**
- 5. Deterioration of existing structures**
- 6. Others**



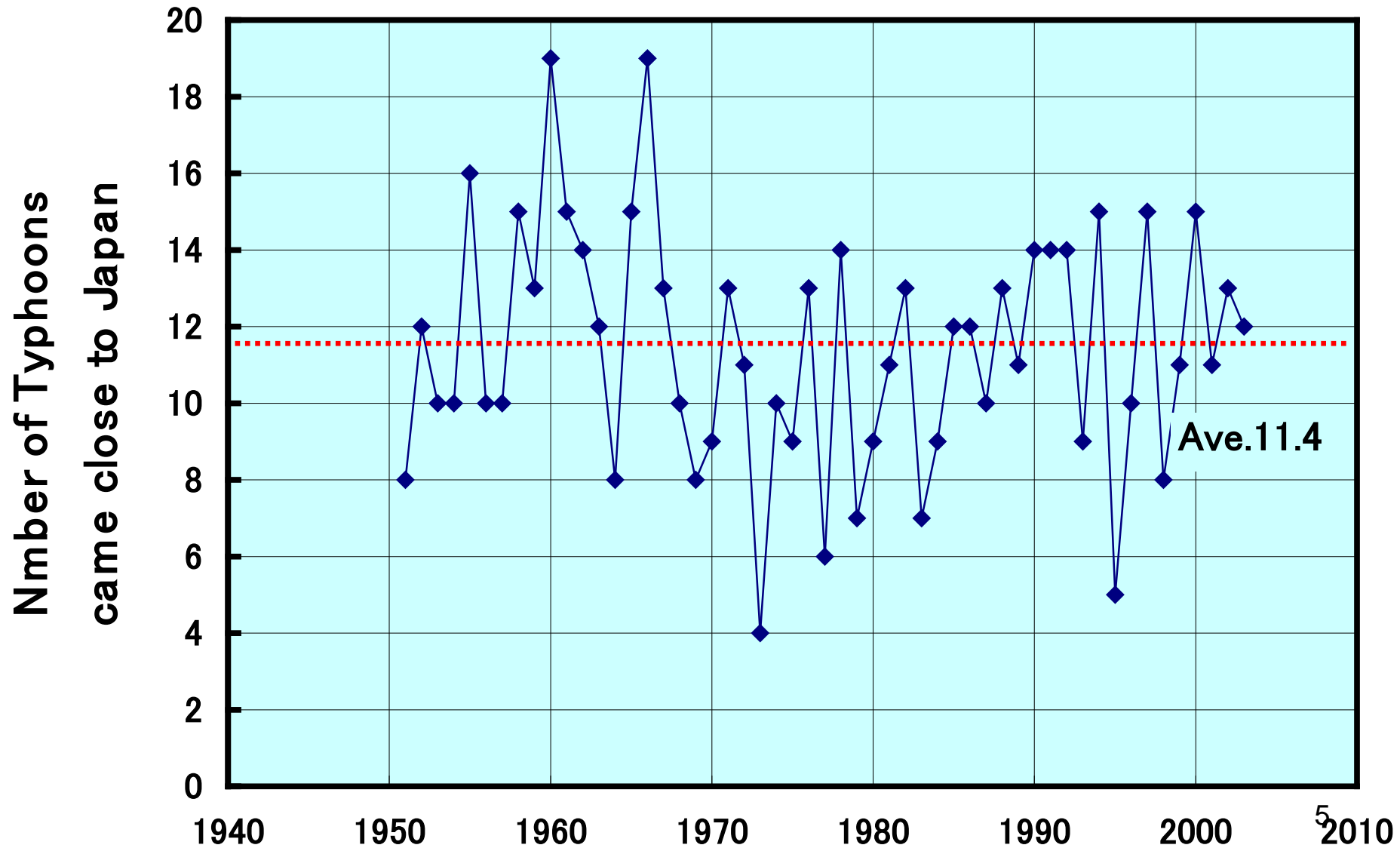
**Hanshin Awaji
Great Earthquake
January 16, 1995**

Fukuoka Tunnel (1,054km839m)

1999



Number of Typhoons per Year coming to Japan



Newspapers on Typhoon No. 23



**Typhoon No. 23
(October 20, 2004
Jiji Press)**





**(October 20, 2004
Jiji Press)**



Newspapers on Niigata-Chuetsu Earthquake

米産牛肉 「月齢証明」で解禁
農産輸入再開、7月までに
サマワ

新潟 震度6強 3回

9人死亡

朝日新聞

読賣新聞

2004年(平成16年) 10月24日 日曜日

生命・健康そして豊かな暮らし
日本化薬
http://www.nipponkayaku.co.jp

新潟 震度6強 3回

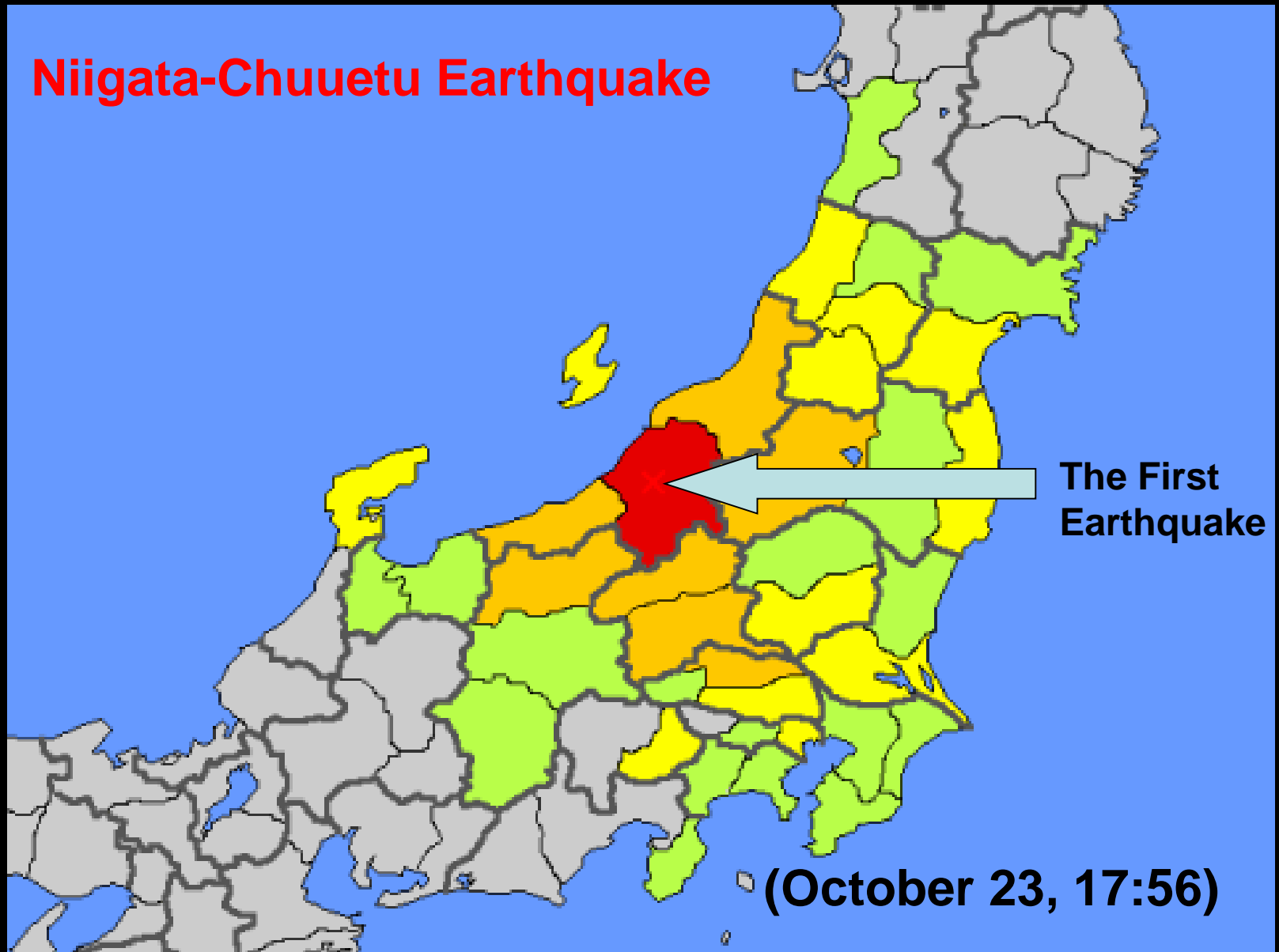
上越新幹線が脱線
死者4人、けが170
建物崩落
など

倒壊や土砂崩れ、人不明

走行中「人的被害なし」

(October 23, 17:56, 2004)

Niigata-Chuuetu Earthquake





**(October 24, 2004
Jiji Press)**



**(October 24, 2004
Jiji Press)**



**(October 24, 2004
Jiji Press)**

Newspapers warning the safety problems of concrete structures in Japan



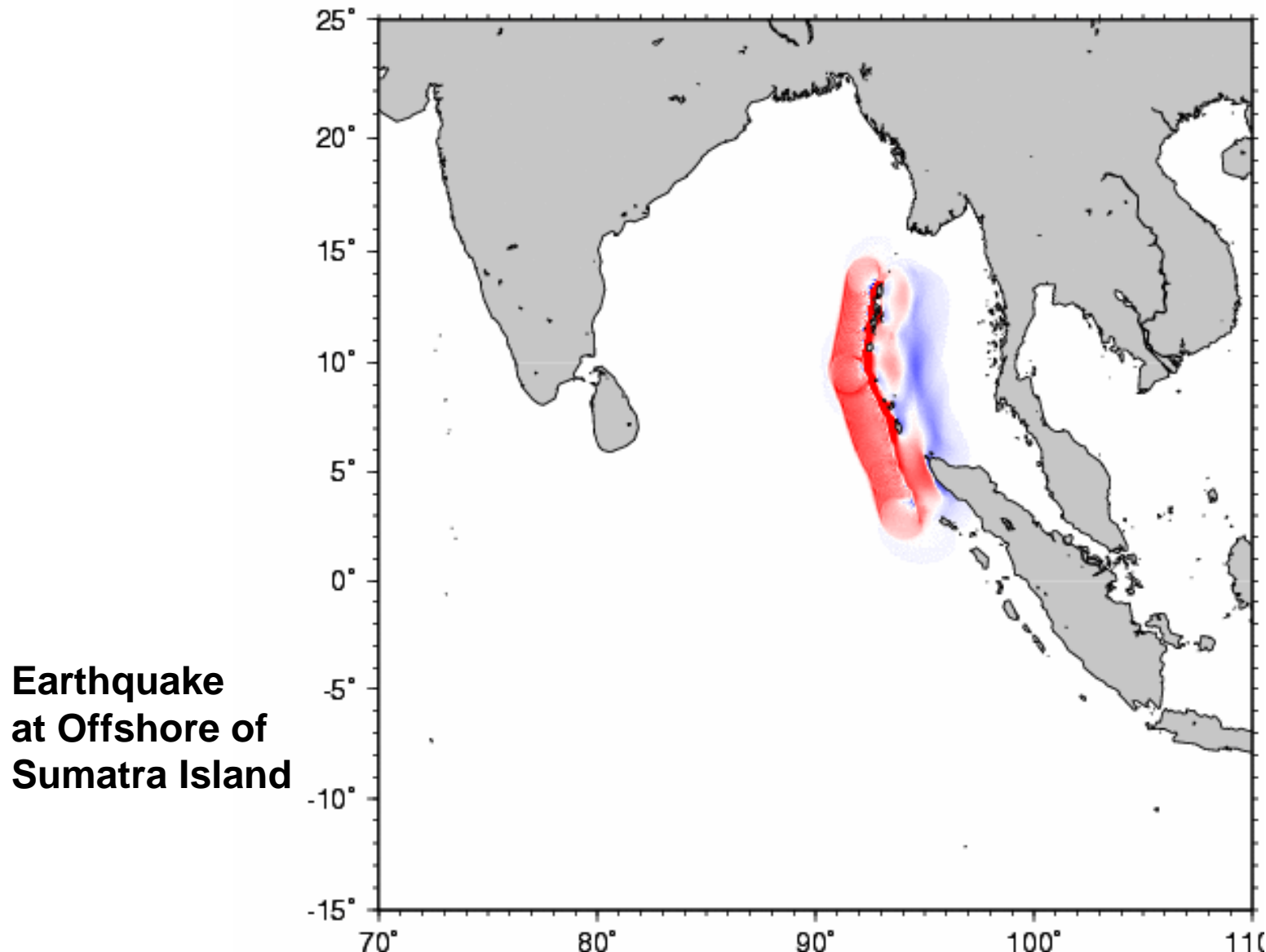
Arrival of Tsunami (Madras, India)



(December 26, 2004
Jiji Press)

Computer Simulation of Tsunami for De. 26, 2004

(Earthquake Research Institute, University of Tokyo)

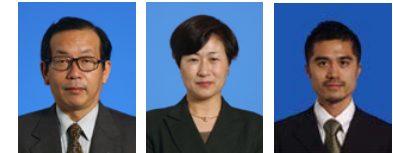


Staff Members (ICUS)

(2004)

Sustainable Engineering Division

- Prof. Taketo UOMOTO (Director and Professor)
- Prof. Reiko AMANO (Visiting Professor)
- Dr. Yoshitaka KATO (Assistant Professor)



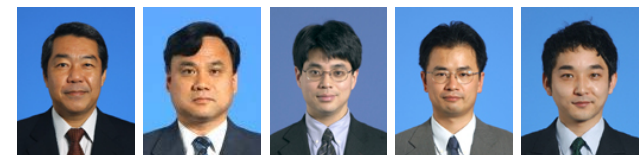
Urban Safety and Disaster Mitigation Division

- Prof. Kimiro MEGURO (Professor)
- Prof. Shogo HAYASHI (Visiting Professor)
- Dr. Dushmanta DUTTA (Associate Professor)
- Miss Miho YOSHIMURA (Research Associate)



Infrastructure Information Dynamics Division

- Prof. Yoshifumi YASUOKA (Professor)
- Prof. Masahiro SETOJIMA (Professor)
- Dr. Ryozo OOKA (Associate Professor)
- Dr. Junichi SUSAKI (Assistant Professor)
- Dr. Takahiro ENDO (Research Associate)



Staff Members (ICUS)

(2004)



Research Topics of ICUS

(2004)

Sustainable Engineering Division

- Deterioration mechanism of existing structures
- Nondestructive testing technology for evaluation of deterioration
- Retrofitting and strengthening of structures based on mechanism of deterioration
- Standard specification for design, construction and maintenance
- Maintenance and management plan



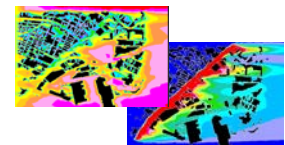
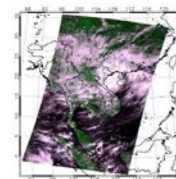
Urban Safety and Disaster Mitigation Division

- Urban safety and disaster mitigation strategy
- Efficient and economic retrofitting method for masonry structures considering local availability of materials and workmanship
- Disaster countermeasures for urban lifeline systems
- Development of integrated information system for total disaster management



Infrastructure Information Dynamics Division

- Remote sensing/geographic information system
- Information network of urban infrastructure
- Space data analysis
- Urban warming/comprehensive environmental assessment



Research Topics (2004)

- Sustainable Engineering -

- Evaluation of long-term durability performance of concrete using epoxy-coated reinforcing steel bars
- Influence of various factors on deterioration of repaired concrete structures
- Development of monitoring system for existing concrete bridges
- Application of multi-spectral method for chloride detection on concrete surface
- Clarification of mechanism of steel corrosion in BS-concrete
- Study on fracture mechanics of steel bar due to ASR
- Evaluation of quality of existing concrete structures by using thermograph method
- Modeling of mass transport property of cementitious materials
- Value evaluation of inspection information in deterioration diagnosis of concrete structures
- Development of new estimation tool for deterioration of concrete based on environmental simulation

Research Topics (2004)

- Urban Safety and Disaster Mitigation -

- Development of integrated information system for total disaster management
- Next generation manual for total disaster management
- Quick estimation and monitoring of earthquake damage using changes in the power supply
- System for promotion of retrofitting of low earthquake resistant structures
- Numerical simulation of total collapse behaviour of structures
- Efficient and economic retrofitting method for masonry structures considering local availability of materials and workmanship
- Development of human evacuation model for tsunami disaster
- Urban flood risk analysis
- Urban hydrologic cycle
- GIS and RS applications in urban risk management
- Climate change impacts on water resources

Research Topics (2004)

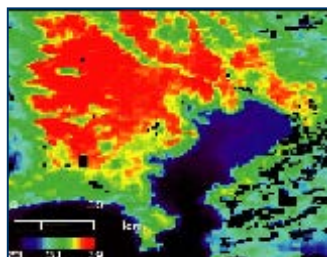
- Infrastructure Information Dynamics -

- Monitoring of the environment in East Asia using satellite data (TERRA/MODIS), (forest fires, extraction of 3D surface feature, albedo, etc.)
- 3D city and trees modeling using data from airborne laser scanning and high resolution digital matrix camera
- Extraction of a stand tree, height and DBH using data from airborne laser scanning and high resolution digital matrix camera
- Study on the evaluation and measure for urbanization of mega cities in ASIA
- Development of estimation method for water stress condition of crop using hyperspectral remote sensing
- Analysis of urban heat island structure in use of urban meteorological model
- Relaxation effect of urban greening on urban heat island
- Urban fire simulation in aid of CFD method
- Prediction of air pollution by wind tunnel experiment and numerical simulation
- Study on the mechanism of CO₂ emission in urban region

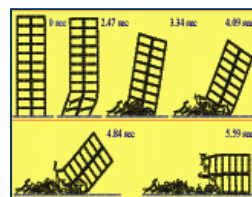
Research and Investigation (2004)



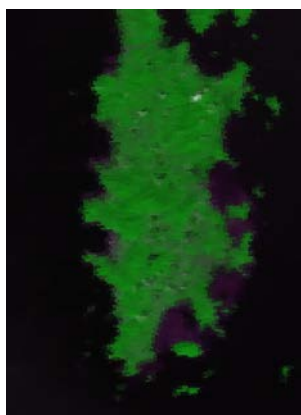
Degradation structure investigation



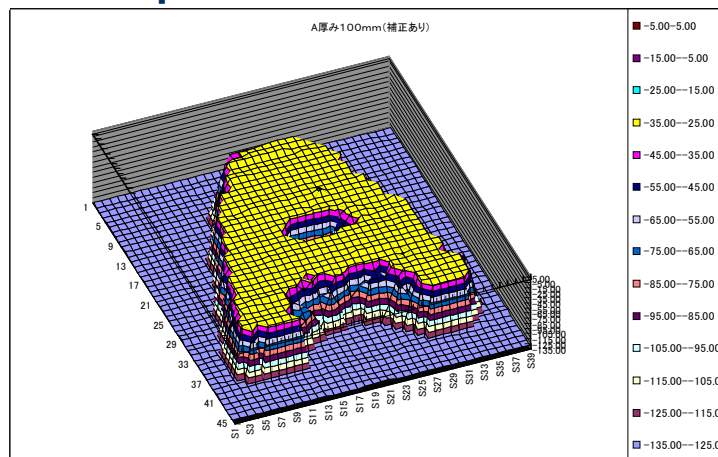
**Heat island monitoring
Earthquake disaster simulation**



Earthquake disaster investigation



Tsunami damage monitoring

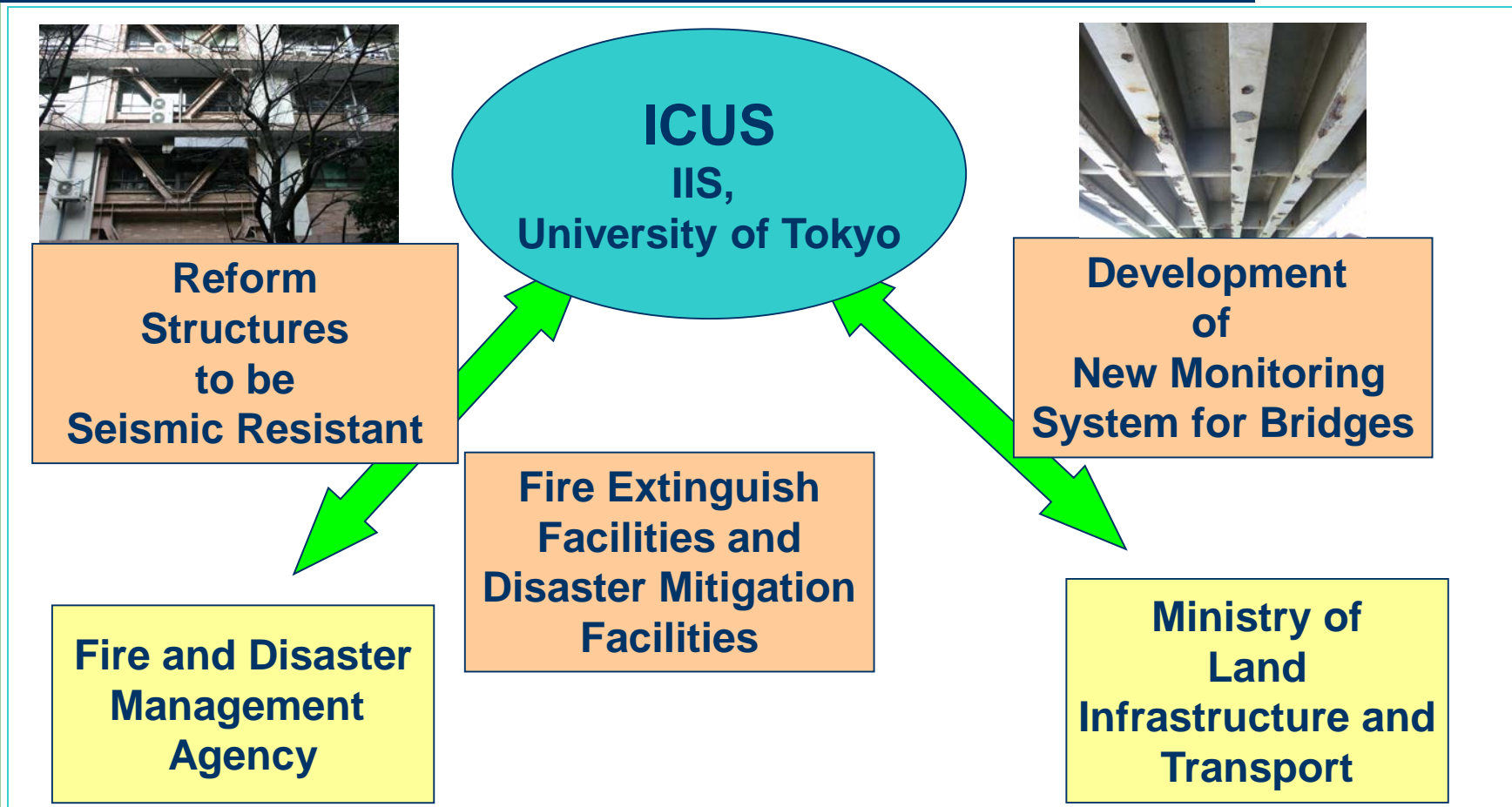


Nondestructive testing analysis



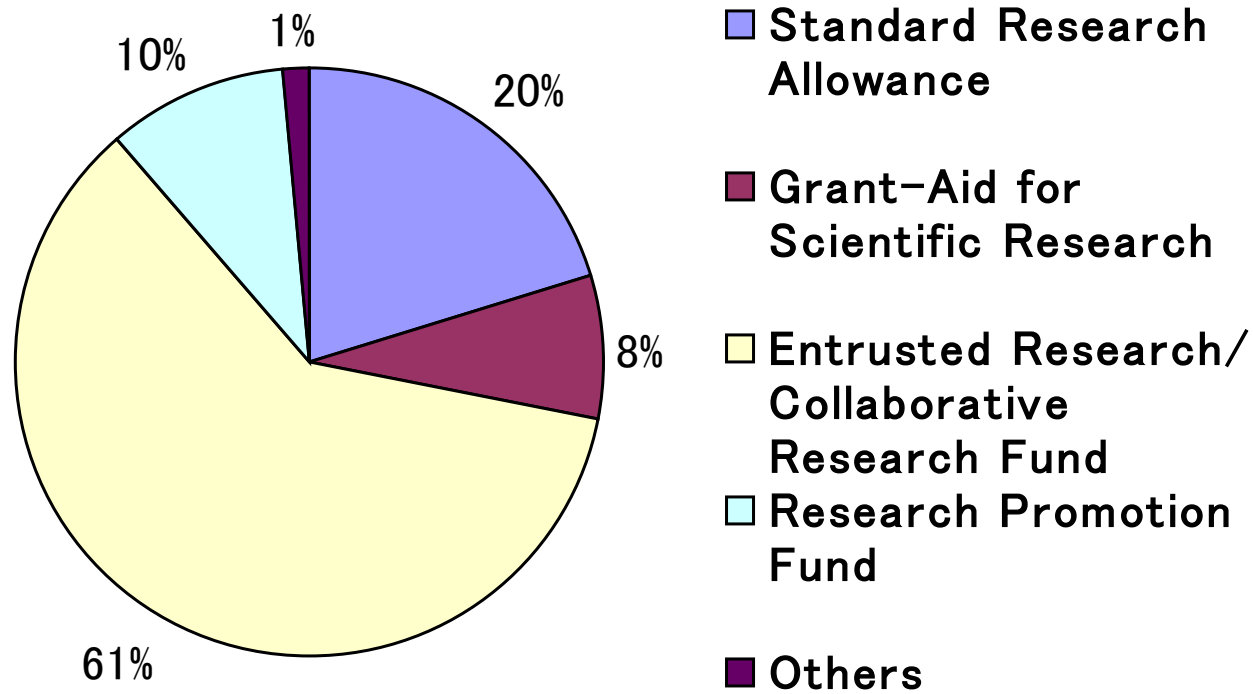
Existing structure investigation and analysis

ICUS Activities with Government (2004)



Budget of ICUS

(2004)



About 400,000,000 JPY

Projects (2004)

- Sustainable Engineering -

Grant-Aid for Scientific Research

- Development of high performance repair system for concrete structures based on environmental simulation

Collaborative Research with Industry

- Study on the evaluation of repair materials for concrete structures
- Development of new techniques of non-destructive and non-contact test for inspection of concrete structures
- Monitoring system for existing concrete bridges
- Study on fatigue properties of concrete beams
- Study on NDT for inspection of concrete structures
- Modeling of mass transport property of concrete considering spatial properties of composition materials
- Effect of chemical admixtures on quality of concrete
- Study on earthquake-proof diagnosis and repair work case collections for disaster prevention of local governments
- Establishment of real time monitoring system for safety evaluation of concrete bridge

Projects (2004)

- Urban Safety and Disaster Mitigation-

Grant-in-Aid for scientific research

- Economic and efficient method for retrofitting of unreinforced masonry structures
- Development of high precision computational techniques for evapotranspiration in urban areas using for water and energy balance methods

Cooperative research with the private sector

- Dynamic and large deformation analysis of railway structures
- Development of next generation disaster manuals for increasing total disaster management capacity
- Effects of power outage on urban social systems
- Development of numerical simulation for increasing the safety of urban infrastructure
- Urban flood inundation modeling in Mekong river basin using a physically based surface-river model

Research Promotion Fund

- Special coordination funds for promoting science and technology (RR2002) special project for urban earthquake disaster mitigation

Projects (2004)

- Urban Safety and Disaster Mitigation-

Research Promotion Fund

「Study for Integration of Earthquake Disaster Reduction Countermeasures,
- Pre-Event Measures」

「Development of Integrated Numerical Simulator for Tsunami Disaster
in Coastal Region」

- Social Technology Research System

「New Technology for Earthquake Risk Assessment and Disaster Mitigation
and Crisis Management」

- Study for disaster reduction by crisis management of information technology
- Development of crisis management system suitable to Japanese Society
- Investigation on the aftermath of Sumatra offshore earthquake and Indian ocean tsunami disaster

Others

- Catastrophic flood risk analysis in Bangkok, Thailand
- Flood forecasting and decision support system for Chao Phraya River Basin, Thailand
- An assessment of the socio-economic impacts of floods under climate change conditions in large coastal cities in south and southeast Asia

Projects (2004)

- Infrastructure Information Dynamics-

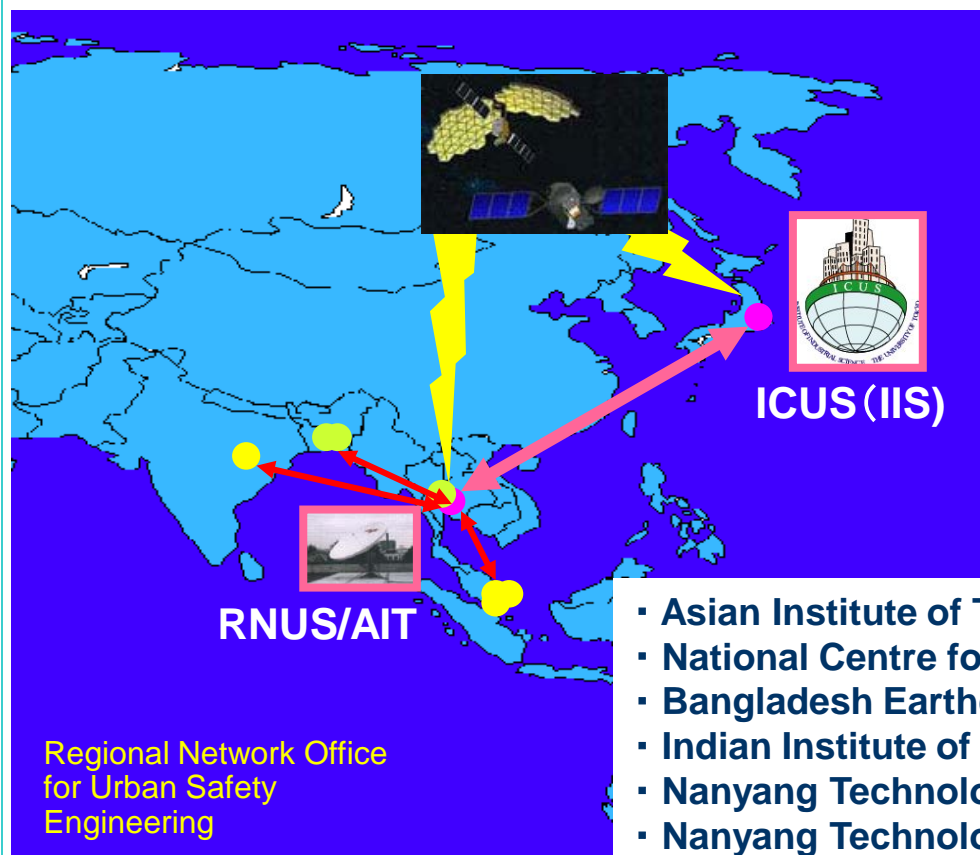
Grant-Aid for Scientific Research

- Development of network for monitoring natural disasters in Asia using satellite remote sensing (JST)
- The application and development of geothermal air-conditioning system using ground heat exchanger utilizing building foundation pile in urban area (NEDO)

Collaborative Research with Industry

- The application and development of geothermal air-conditioning system using ground heat exchanger utilizing building foundation pile
- Study on progress of heat-island effect in Tokyo 23 wards area by numerical meteorological model
- Basic analytical research on the influence factor to outdoor thermal environment of residence region scale – mechanism clarification of new phenomenon and application development
- Study on the influence of air-conditioning systems and distributed local energy supply systems on heat-island phenomenon

Activities of Network Office of ICUS (2004)



Memorandum of Understanding and The joint research network

- Asian Institute of Technology School of Civil Engineering
- National Centre for Earthquake Engineering (BUET)
- Bangladesh Earthquake Society(BES)
- Indian Institute of Technology, Kanpur
- Nanyang Technological University College of Engineering
- Nanyang Technological University (PTRC)
- National University of Singapore Dept. of Civil Engineering

Activities

(2004)

Domestic

- SEIKEN Open House (June 5-6, 2004) IIS
- 6th ICUS Open Lecture (April 9, 2004) IIS
“WORLD AND JAPAN, PEACE AND DISASTER PREVENTION”
- 7th ICUS Open Lecture (September 29, 2004) IIS
“PREDICTION AND COUNTERMEASURES OF GLOBAL DISASTER IN ASIA”
- 8th ICUS Open Lecture (February 28, 2005) IIS
“EARTHQUAKE, TYPHOON AND FIRE – MESSAGE FROM DISASTER SITES”

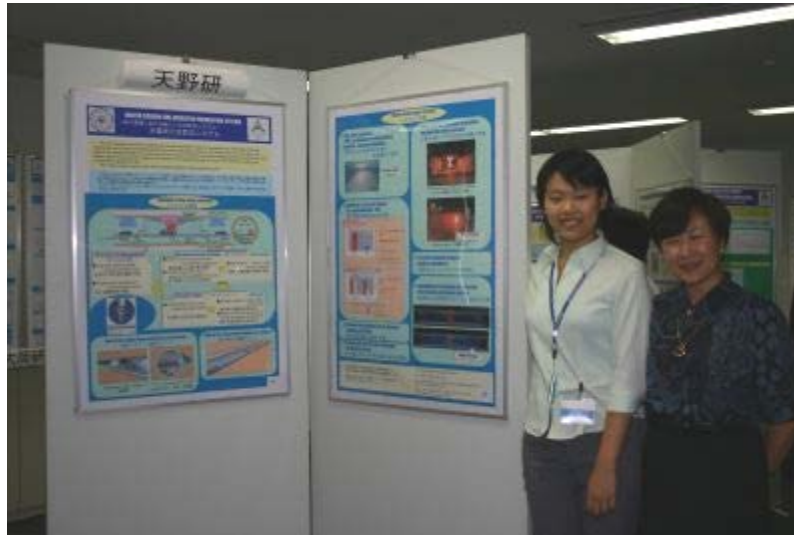
International

- The 3rd International Symposium on New Technologies
for Urban Safety of Mega Cities in Asia (October 30-31, 2004)
Agra, India (Jaypee Palace Hotel)

Activities (2004)

- Open house -

“SEIKEN Open house”



Open house of ICUS was held in conjunction with open house of IIS.



June 5-6, 2004

Activities (2004)

- Open Lecture -

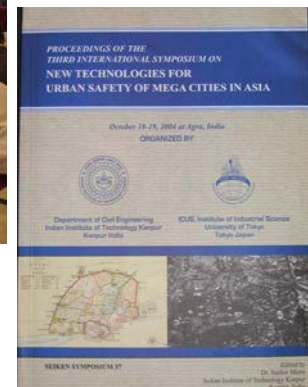
Photographs taken at the “7th ICUS Open Lecture”



Activities (2004)

- Workshop -

**The 3rd International Symposium on New Technologies for Urban Safety of Mega Cities in Asia (October 30-31, 2004)
Agra, India (Jaypee Palace Hotel)**



Activities (2004)

– Industry-university joint research–

Three Working Groups have been organized for conducting the activities of RC39. The themes of these Working Groups are as follows; 1) Aging infrastructure management, 2) Disaster prevention, and 3) Environment.



Publications

(2004)

- News Letter Volume4 Number 1–4
- ICUS Report 2004-01 – 2004-03
 - “Seismic risk management for countries of the Asia pacific region”
 - “Report on the result of the concrete degradation of the bridge”
 - “2004 NEW TECHNOLOGIES FOR URBAN SAFETY OF MEGA CITIES IN ASIA”
- ICUS Committee Report 2004-01
- SEIKEN SYMPOSIUM 37
- KNOW RISK
- The 4th workshop for “Comparative Study on Urban Earthquake Disaster Management”
- Annual report

@ News letters were sent to about 150 countries, foreign embassies /consulates in Japan and 1,500 researchers. The letters can be down loaded from “ <http://icus.iis.u-tokyo.ac.jp/> ” free of charge.

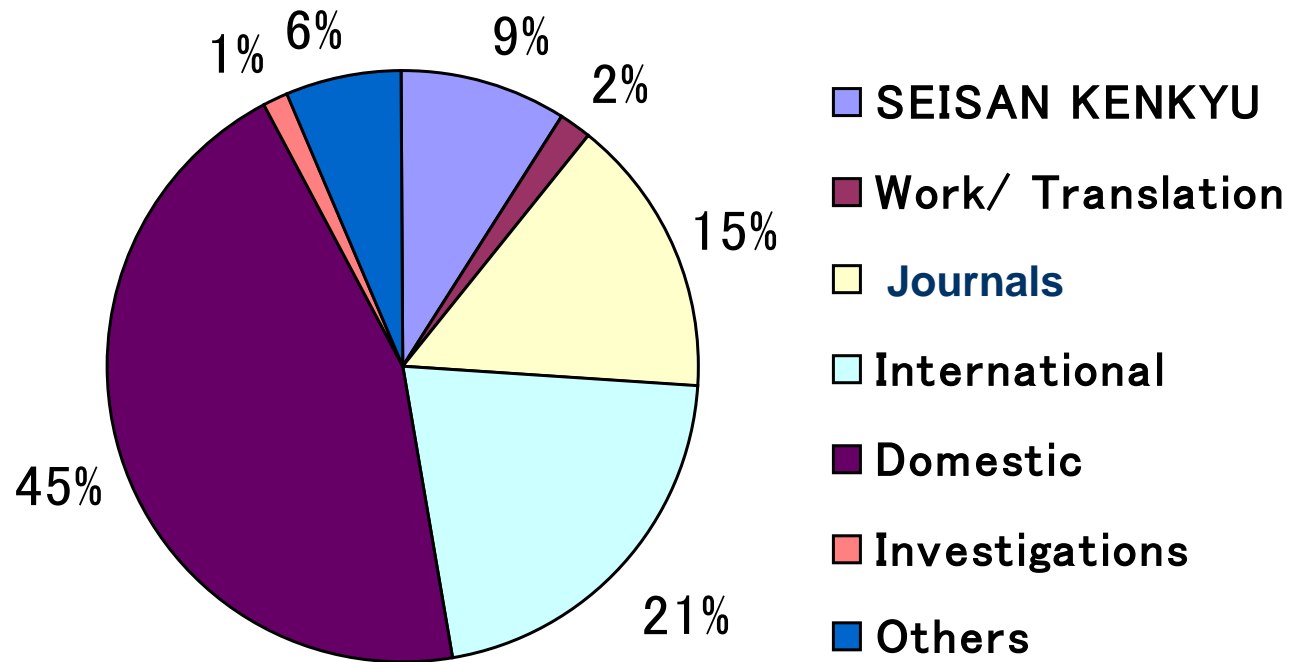
Research Papers

(2004)

	Sustainable Engineering Division	Urban Safety and Disaster Mitigation Division	Infrastructure Information Dynamics Division
SEISAN KENKYU	15	8	4
Work/Translation	1	2	2
Society magazine	16	8	18
International	18	27	18
Domestic	37	25	71
Investigations	1	3	0
Others	0	17	2
Total	88	90	115

Research Papers

(2004)





ICUS Activities Recognized (2004)

Name	Date	Prize Name	Organization	Supervisor
K. SHIRASE	May-04	Excellent presentation award	JCA	Prof. UOMOTO
P. SANCHAROEN	May-04	Excellent presentation award	JCA	Prof. UOMOTO
K. OOHOSHI	Jun.-04	Best presentation award	JSPRS	Prof. YASUOKA
S.KONDO	Sep.-04	Excellent presentation award	JSCE	Prof. MEGURO
A. ONEZAWA	Sep.-04	Excellent presentation award	JSCE	Dr. KATO
N. TAKESHITA	Sep.-04	Excellent presentation award	JSCE	Dr. KATO

JCA: Japan Cement Association

JSCE: Japan Society of Civil Engineers

JSPRS: Japan Society of Photogrammetry and Remote Sensing

Future Activities of ICUS

	2001	2002	2003	2004	2005	2006	2007
Collaborative Research							
AIT(RNUS)	○	○ 1	1	2	2	2	2
Chula, Tammasart, etc							
IIT(Kanpur)				○			
BUET							
NUS, NTU					○		
KISTEC							
Funded Activities							
Industry							
Ministry of Education							
Ministry of Construction							
Fire & Disaster Man. Agency							
NEDO							

○ (In Tokyo)

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for Urban Safety Engineering (ICUS)**

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URL: **<http://icus.iis.u-tokyo.ac.jp/>**